

SP00335 (2015 Specifications: ~~11-13-14~~12-10-15)

## SECTION 00335 - BLASTING METHODS AND PROTECTION OF EXCAVATION BACKSLOPES

*(Follow all instructions. If there are no instructions above a subsection, paragraph, sentence, or bullet, then include them in the project. The specifications may be modified to include project specific specifications, but all additions, deletions, or modifications must be sent to the ODOT Technical Resource and Senior Specifications Engineer for review and approval.)*

*(Use the following lead-in paragraph when subsections .44, .45, .46, .47, and .48 are NOT included in the project.)*

Comply with Section 00335 of the Standard Specifications.

*(Use the following lead-in paragraph when subsections .44, .45, .46, .47, or .48 are included in the project.)*

Comply with Section 00335 of the Standard Specifications modified as follows:

00335.40(e) Blasting Notification - Replace the paragraph that begins "Provide notifications, in writing..." with the following paragraph:

Provide notification, in writing, once, at least 48 hours before blasting begins, and again on the day the blasting operations occur.

*(Use the following subsection .41(a-2) when presplitting is required.)*

00335.41(a-2) - Replace this subsection, except for the subsection number, with the following:

Drill presplit holes with a minimum diameter of 2.5 inches and a maximum diameter of 3 inches.

*(Use the following lead-in and subsection .41(a-11) when presplitting is required.)*

Add the following subsection:

00335.41(a-11) Drill the presplit holes with a minimum spacing of 10 times and a maximum spacing of 14 times the presplit hole diameter.

*(Use the following lead-in paragraph and subsections .44, .45, .46, .47, and .48 when directed by the Geotechnical Group.)*

Add the following subsections:

**00335.44 Blasting Consultant** - Retain a recognized blasting consultant to assist in the blast design. The consultant shall be an expert in the field of drilling and blasting who

specializes in providing blasting consulting services. The consultant shall not be an employee of the Contractor, explosives manufacturer, or explosives distributor. A list of approved blasting consultants may be obtained from the Engineer.

If the proposed blasting consultant is not on the approved list, submit the credentials of the proposed blasting consultant not later than the preconstruction conference. Use the blasting consultant only after approval is obtained from the Engineer and before beginning any drilling and blasting work. The blasting consultant shall make an on-site inspection of the jobsite before developing a blasting plan. All blasting plans, including revisions, shall be approved, in writing, by the blasting consultant.

Submit the consultant assisted blast design to the Engineer according to 00335.40(d).

**00335.45 Vibrations Specialist** - Provide a qualified vibrations specialist in vibration monitoring and analysis using seismographs to confirm the safe vibration and air overpressure limits. Submit documentation of prior experience for all personnel involved in monitoring. The vibrations specialist shall also interpret the seismograph records to ensure that the seismograph data is effectively utilized in the control of the blasting operations with respect to the existing structures.

**00335.46 Vibration Control and Monitoring** - Control ground vibrations by using properly designed blast hole patterns, delay sequences, stemming, and allowable charge weights per delay. Base the allowable charge weights per delay on ground vibration levels which will not cause damage. Establish allowable charge weights per delay by carrying out test blasts and measuring ground vibration levels. Perform test blasts according to 00335.40(f), modified as required to limit ground vibrations to a level which will not cause damage.

Monitor each blast with an approved seismograph located, as approved, between the blast area and the closest structure, facility, or utility subject to blast damage. The seismograph used shall be capable of recording particle velocity for three mutually perpendicular components of vibration in the range generally found with controlled and production blasting.

Operate the seismographs according to the recommended guidelines of the International Society of Explosives Engineering Seismograph Section, titled "ISEE Field Practice Guidelines for Blasting Seismographs". The applicable guidelines are those contained in the current publication on the date the Project is advertised.

Do not allow peak particle velocity of each component to exceed the safe limits of the nearest structure subject to vibration damage as follows:

<b>Structure</b>	<b>Maximum Peak Particle Velocity at the Structure (Inch/Second)</b>
Standard Construction Timber Frame, Brick, and Concrete Buildings.....	2.0
Reinforced Concrete Structures.....	4.0
Steel Structures .....	4.0
Buried Utilities.....	2.0
Wells and Aquifers.....	2.0

Green Concrete (Less than 7 days) ..... 1.0

If the vibration levels exceed the limits, immediately report the measurements to the Engineer.

**00335.47 Air Overpressure and Noise Control** - Install an air overpressure monitoring system of the type specifically manufactured for that purpose between the main blasting area and the nearest structure subject to blast damage. Limit air overpressure to 133 dBL (0.013 psi) at nearest structure, facility, or other designated location. Use appropriate blast hole patterns, detonation systems, and stemming to prevent venting of blasts and to minimize air overpressure and noise levels produced by the blasting operations. Lower the air overpressure limit if it proves too high based on damage or complaints. If the air overpressure levels exceed the limits, immediately report the measurements to the Engineer.

**00335.48 Vibration and Air Overpressure Monitoring Report** - Furnish a vibration monitoring report for each shot before the next blast that includes the following:

- Manufacturer, model, and serial number of blasting-type seismograph for each monitoring location.
- Name of qualified seismograph operator and interpreter.
- Distance and direction of recording station from blast area.
- Geophone coupling method.
- Maximum particle velocity and peak frequency of each component.
- Maximum value of air overpressure and the peak air overpressure frequency.
- A dated and signed copy of time-histories of all seismograph and air overpressure monitoring system readings.